

Response After Final
Serial No. 09/665,911
Amendment dated December 28, 2004
Reply to Office Action of July 15, 2004

REMARKS

Rejections under 35 USC §103(a)

Claims 1, 5-7, and 9 are rejected under 35 USC §103(a) as being unpatentable over Hata (U.S. Patent No.6,215,803) in view of Hatano et al (U.S. Patent No. 5,998,810).

Claim 1 recites, among other things, “a first current blocking layer formed on said flat portion and on sidewalls of said ridge portion of said cladding layer and composed of a high-resistive nitride based semiconductor containing impurities” and “wherein said impurities contain at least one of zinc, beryllium, calcium, and carbon.”

The Examiner admits that the “difference between the Hata and the claimed invention is the impurities containing at least one of zinc, beryllium, calcium, and carbon.” Then the Examiner alleged in the Office Action as follows:

Hatano discloses a p-type AlGaN layer 44 containing Mg and carbon impurities (column 10, lines 20-22). In view of such teaching, it would have been obvious . . . to modify the invention of Hata by including carbon impurities in the first current blocking layer for the purpose of forming a deep acceptor level thereby compensating the residual donors (column 10, lines 24-29 of Hatano).

Applicants submitted in the previous response, “Column 10, line 24 of Hatano discloses that the addition of Mg and C increases the p-type carrier concentration. Hatano does not suggest that a high resistance can be obtained by C doping. Moreover, the P-type AlGaN layer 44 of Hatano et al is a cladding layer, not a current blocking layer.”

Response After Final
Serial No. 09/665,911
Amendment dated December 28, 2004
Reply to Office Action of July 15, 2004

MPEP explains about prima facie case of obviousness as follows:

2143 Basic Requirements of a Prima Facie Case of Obviousness

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

2143.01 Suggestion or Motivation To Modify the References [R-2]

THE PRIOR ART MUST SUGGEST THE DESIRABILITY OF THE CLAIMED INVENTION

There are three possible sources for a motivation to combine references: (1) the nature of the problem to be solved, (2) the teachings of the prior art, and (3) the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a prima facie case of obviousness was held improper.). The level of skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

"In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed

Response After Final

Serial No. 09/665,911

Amendment dated December 28, 2004

Reply to Office Action of July 15, 2004

substitution, combination, or other modification.” *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. “The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.” *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

The rejection is improper because the Examiner at least has not shown “suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings” and “a reasonable expectation of success.” Hatano describes at the cited paragraph as follows:

FIG. 4 illustrates a cross-sectional structure of a semiconductor laser 40 according to this invention. The laser 40 comprises a p-type SiC substrate 41 on which a GaN buffer layer 42 having a thickness of 10 nm is formed for alleviating a mismatching of lattice. On this GaN buffer layer 42 are further deposited a p-type GaN layer 43 (2 .mu.m in

Response After Final

Serial No. 09/665,911

Amendment dated December 28, 2004

Reply to Office Action of July 15, 2004

thickness), a p-type AlGaN layer 44 (500 nm in thickness), an InGaN active layer 45 (100 nm in thickness), an n-type AlGaN layer 46 (500 nm in thickness) and an n-type GaN layer 47 (300 nm in thickness) in the mentioned order. Each of these layers are made into a p-type or an n-type conductivity by the addition of a suitable impurity or impurities. Specifically, the impurities added to the p-type GaN layer 43 and the p-type AlGaN layer 44 are Mg and C. On the other hand, the impurity added to the n-type AlGaN layer 46 and the n-type GaN layer 47 is Si. **Among these impurities, C (carbon) in the p-type layers 43 and 44 functions to form a deep acceptor level thereby compensating the residual donors, thus making it possible to achieve an increased carrier concentration through the addition of Mg which forms a relatively shallow acceptor level.**

(Hatano column 10, lines 9-29, emphasis added). Here, Hatano discloses that the addition of Mg and C increases the carrier concentration, but does not teach or suggest that a high resistance can be obtained by doping of C. Also, in Hatano, the P-type AlGaN layer 44 is a cladding layer, not a current blocking layer.” The Examiner has not shown how the doping of Mg and C makes suggestion or motivation to modify the teaching of Hata.

In response to Applicant's argument, the Examiner alleged: “Hatano is relied upon for the teaching of a p-type AlGaN layer containing Mg and carbon impurities. The function of that layer is not germane to the rejection set forth above.” A person of ordinary skill in the art, however, would not understand why doping of Mg and C to **increase the carrier concentration** into the **cladding layer 44** in Hatano, makes suggestion or motivation of doping of C to the “**first current blocking layer** formed on

Response After Final
Serial No. 09/665,911
Amendment dated December 28, 2004
Reply to Office Action of July 15, 2004

said flat portion and on sidewalls of said ridge portion of said cladding layer and composed of a **high-resistive** nitride based semiconductor containing impurities."

Where there is no suggestion and motivation, there cannot be a reasonable expectation of success.

Thus, the rejection has not established a *prima facie* case of obviousness for claim 1. The rejection also has not established a *prima facie* case of obviousness for claims 5-7, and 9, directly or indirectly depending from claim 1. Therefore, claims 1, 5-7 and 9 patentably distinguish over Hata in view of Hatano.

Responding to Applicants' previous response, the Examiner alleged:

In response to Applicant's argument that "layers 66 and 77 as disclosed in Figure 3 of Hata are both p-type layers, not high resistive layers", **Applicant has not specifically defined "high-resistive". Therefore, layers 66 and 77 of Hata, which inherently have a resistance, can be considered "high-resistive" as claimed.**

(Emphasis added).

Claim 1 has been amended to recite, "wherein the first current blocking layer is composed of AlGaN having a larger Al composition ratio than that of the cladding layer the first current blocking layer having a resistance value of not less than 1.5 Ω·cm."

Thus, resistance value of the first current blocking layer is clearly defined, and claim 1 further patentably distinguishes over Hata in view of Hatano. All other claims dependent thereon are also further patentably distinguished over Hata in view of Hatano.

Response After Final
Serial No. 09/665,911
Amendment dated December 28, 2004
Reply to Office Action of July 15, 2004

Claim 3 is rejected under 35 USC §103(a) as being unpatentable over Hata in view Hatano as applied to claim 1 above, and in further view of Johnston, Jr. et al.

Claim 8 is rejected under 35 USC §103(a) as being unpatentable over Hata in view Hatano as applied to claim 1 above, and in further view of Hiroyama et al. Claim 10 is rejected under 35 USC §103(a) as being unpatentable over Hata in view Hatano as applied to claim 1 above, and in further view of Hirata.

In view of the difference in the blocking layer between the present invention and Hata and Hatano as explained above, independent claim 1 patentably distinguishes over Hata and Hatano. Also, all claims dependent from claim 1 also patentably distinguish over Hata and Hatano further in view of additional secondary references which do not remedy the deficiencies of Hata and Hatano.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

Response After Final
Serial No. 09/665,911
Amendment dated December 28, 2004
Reply to Office Action of July 15, 2004

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



Sadao Kinashi

Attorney for Applicants
Registration No. 48,075
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

SK/sg